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MEMORANDUM

TO:	Greg Carli	REF. NO.:	56393
FROM:	Paul Wiseman/tl/2/Det 	DATE:	October 5, 2011
RE:	Data Quality Assessment and Full Validation Groundwater Monitoring - April, 2011 12 th Street Landfill, Ostego Township, Michigan	Revised:	November 1, 2011

The following details a quality assessment and validation of the analytical data resulting from the April 6, 7, and 8, 2011, collection of 15 water samples, and four (4) quality control samples from the 12th Street Landfill Site in Ostego Township, Michigan. The sample summary detailing sample identification, sample location, quality control samples, and analytical parameters is presented in Table 1. Sample analysis was completed with the methodologies presented in Table 2.

The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP). Application of quality assurance criteria was consistent with following guidance documents:

- i. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-99/008, October 1999;
- ii. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Review", EPA-540/R-94/013, February 1994.

These guidelines are collectively referred to as "NFGs" in this Memorandum.

Sample Quantitation

The laboratory reported detected concentrations of volatile organic compounds (VOC), polychlorinated biphenyls (PCB) and inorganics below the laboratory's report limit (RL) but above the laboratory's method detection limit (MDL). The laboratory flagged these sample concentrations with a "J", these concentrations should be qualified as estimated (J) values unless qualified otherwise in this memorandum.

Sample Preservation and Holding Times

Sample holding time periods and preservation requirements are presented in Table 2.

The samples were shipped and maintained in accordance with the sample preservation requirements.

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Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration (Instrument Performance Check) – Organic Analyses

To ensure adequate mass resolution, identification, and to some degree, sensitivity; the performance of each GC/MS instrument used for volatile organic compounds (VOC) analysis was checked at the beginning of each 12-hour period using bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the NFGs before initiating an analysis sequence.

Instrument performance check data were reviewed. These tuning compounds were analyzed at the required frequency throughout the VOC analyses. The results of all instrument performance checks were within the acceptance criteria, indicating acceptable instrument performance.

Initial Calibration – Organic Analyses

Initial calibration data are used to demonstrate that each instrument is capable of generating acceptable quantitative data. A five point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each over a specific concentration range.

Initial calibration criteria for organic analyses are evaluated against the following criteria:

- i. GC/MS (all compounds) – must meet a minimum mean relative response factor (RRF) of 0.05;
- ii. GC/MS (all compounds) – the percent relative standard deviation (RSD) values must not exceed 30.0 percent or a minimum coefficient of determination of 0.99 if quadratic equation calibration curves are used; and
- iii. GC (all compounds using an average for multi-response compounds) – the percent RSD must not exceed 20 percent or a correlation coefficient of 0.995 when linear regression calibration curves are used.

Calibration standards were analyzed at the required frequency and the results met the above criteria for linearity and sensitivity with the exception of the qualified samples presented in Table 3.

Continuing Calibration – Organic Analyses

To ensure that each instrument was capable of producing acceptable quantitative data over the analysis period, continuing calibration standards must be analyzed every 12 hours for GC/MS analyses and every 10 samples by GC. The following criteria are employed to evaluate the continuing calibration data:

- i. GC/MS (all compounds) – must meet a minimum mean RRF of 0.05;
- ii. GC/MS (all compounds) – the percent difference between the mean initial calibration RRF and the continuing calibration RRF must not exceed 25 percent;
- iii. GC/MS (compounds determined by quadratic curve) – the percent drift between the true value and the continuing calibration value must not exceed 25 percent;
- iv. GC (all compounds using average for multi-response compounds) – the percent difference between mean initial calibration factor and the continuing calibration factor must not exceed 15 percent; and
- v. GC (compounds determined by linear regression) – the percent drift between the true value and the continuing calibration value must not exceed 15 percent.

Continuing Calibration – Organic Analyses (Continued)

Calibration standards were analyzed at the required frequency and the results met the above criteria for instrument sensitivity and linearity of response and sensitivity with the exception of the qualified samples presented in Table 4.

Inductively Coupled Plasma/Mass Spectrometer (ICP/MS) –
Mass Calibration and Resolution Checks – Metal Analyses

To ensure adequate mass resolution, identification, and to some degree, sensitivity; the performance of each ICP/MS instrument used for metals analyses was checked prior to calibration before initiating an analysis sequence through the analysis of a tuning solution. The results of the tuning solution analysis were reviewed against the following criteria:

- i. Analyze tuning solution a minimum of four times with a percent RSD of less than or equal to five for the analytes contained in the tuning solution; and
- ii. The mass resolution must be within 0.1 amu of the true value over the analytical range

Instrument performance check data were reviewed. The tuning solution was analyzed at the required frequency throughout the analyses. The results of all instrument performance checks were within the acceptance criteria, indicating acceptable instrument performance.

Initial Calibration – Inorganic Analyses

The initial calibration includes a blank and at least one standard for inductively coupled plasma (ICP) and ICP/MS to establish the analytical curve. Mercury analysis by cold vapor atomic absorption spectroscopy (CVAA) and cyanide analysis by spectrophotometry requires the analysis of a calibration blank and a minimum of five standards to establish the calibration curve. The coefficient of variation for calibration curves must exceed 0.995.

Initial calibration is verified with an initial calibration verification (ICV) standard which must recover within 90 to 110 percent for metals by ICP and ICP/MS, 80 to 120 percent for mercury by CVAA and 85 to 115 percent for cyanide by spectrophotometry.

A review of the laboratory data showed that the inorganic initial calibration curves and ICVs were analyzed at the appropriate frequency and were within the acceptance criteria.

Continuing Calibration – Inorganic Analyses

Continuing calibration verification (CCV) standards are analyzed at method specified frequency (one every 10 samples). The CCVs must meet the percent recovery control limits specified above for the ICVs. Criteria for inorganic analyses are the same criteria as used for assessing the initial calibration data.

A review of the laboratory data showed that CCVs were analyzed at the appropriate frequency and the data were within the acceptance criteria.

Method Blank Samples

Method blank samples are prepared from a purified sample matrix and are processed concurrently with investigative samples to assess the presence and the magnitude of sample contamination introduced during sample analysis. Method blank samples are analyzed at a minimum frequency of one per analytical batch and target analytes should be non-detect.

The samples presented in Table 5 should be qualified due to laboratory contamination. The remaining method blank samples did not contain target compounds with concentrations that impacted the investigative samples.

Laboratory Blank Samples – Inorganic Analyses

Metals analyses include the analysis of initial calibration blanks (ICB) and continuing calibration blanks (CCB) to assess the presence and the magnitude of sample contamination introduced during sample analysis. The CCBs are analyzed at a minimum frequency of one every 10 samples and target analytes should be non-detect.

Several ICB and CCBs were reported with detectable concentrations of target analytes. The samples presented in Table 6 should be qualified due to ICB and CCB contamination above the laboratory MDLs. The remaining ICB and CCBs did not contain elements with concentrations that impacted the investigative samples.

Surrogate Compounds – Organic Analyses

Individual sample performance for organic analyses was monitored by assessing the results of surrogate compound percent recoveries. Surrogate percent recoveries are reviewed against the laboratory developed control limits provided in the analytical report.

The surrogate recovery acceptance criteria were met for all samples that could be evaluated.

Matrix Spike/Matrix Spike Duplicate Analyses

To assess the long term accuracy and precision of the analytical methods on various matrices, matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the relative percent difference (RPD) of the concentrations were determined. The organic MS/MSD percent recovery and RPD control limits are established by the laboratory. The inorganic control limits are defined by the methods or the laboratory and the NFG. The samples selected for MS/MSD analysis are identified in Table 1.

The MS/MSD percent recoveries and associated RPD acceptance criteria were met in the sample analyses.

Laboratory Control Sample Analyses

The laboratory control sample (LCS) analyses serves as a monitor of the overall performance in all steps of the sample analysis and is analyzed with each sample batch. The LCS percent recoveries were evaluated against method and laboratory established control limits.

Laboratory Control Sample Analyses (Continued)

The LCS percent recoveries were within the laboratory control limits or did not warrant qualification, indicating that an acceptable level of overall performance was achieved.

Inductively Coupled Plasma (ICP) Interference Check Sample Analysis - Inorganic Analyses

To verify that proper inter-element and background correction factors had been established by the laboratory for metals analyses, the ICP interference check samples (ICS) are analyzed. The ICSs are evaluated against recovery control limits of 80 to 120 percent.

The ICS analysis results were evaluated for all samples and were within the control limits.

Internal Standard Summaries - Organic Analyses

To correct for variability in the GC/MS response and sensitivity, internal standard (IS) compounds are added to all samples. All results are calculated as a ratio of the compound and associated IS response. Overall instrument stability and performance for VOC analyses were monitored using IS peak area and retention time (RT) data. The IS peak areas and RTs of the samples are required to meet the following criteria:

- i. IS area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated continuing calibration standard IS area counts; and
- ii. The RT of the IS must not vary by more than plus or minus 30 seconds from the associated continuing calibration standard.

A review of the VOC internal standard data showed that the IS area counts and retention time data were within the acceptance criteria.

Internal Standard Summaries - Inorganic Analyses

To correct for variability in the ICP/MS response and sensitivity, internal standards (IS) are added to all samples. All results are calculated as a ratio of the IS response to the response of the sample. Overall instrument stability and performance for metals analyses was monitored using the IS intensity data which are evaluated against the following criteria:

- i. The IS intensities in samples must recover between 30 and 120 percent of the true value; and
- ii. The IS intensities in instrument calibration checks (CCVs and CCBs) must recover between 60 and 125 percent of the true value.

A review of the ICP/MS metals IS data showed that the IS intensities were within the acceptance criteria.

Serial Dilution - Inorganic Analyses

The percent difference (D) between a serial dilution of a sample for each matrix was monitored to determine physical or chemical interference. A minimum of one sample per 20 investigative samples is

Serial Dilution – Inorganic Analyses (Continued)

analyzed at a five-fold dilution. The serial dilution results must agree within 10 percent D of the original results for samples with detected concentrations greater than 50 times the instrument detection limit.

The percent D acceptance criteria was met with the exception of the qualified samples presented Table 7.

Duplicate Sample Analyses – Inorganic Analyses

The laboratory precision of matrix-specific metals methods was monitored by the analyses of duplicate samples.

The duplicate relative percent difference (RPD), were within the acceptance criteria.

Post Digestion Spike Analyses – Inorganic Analyses

At least one spiked (pre-digestion) sample is prepared and analyzed for each analytical batch of metals. When the pre-digestion spike recovery falls outside of the control limits and the sample result is greater than four times the spike added, a post digestion spike is performed for those analytes that do not meet the specified criteria.

The post digestion spike results were evaluated and were within the control limits.

Contract Required Detection Limit (CRDL) Analyses – Inorganic Analyses

The instrument calibration near the Contract Required Detection Limit (CRDL) must be verified for each analyte reported. An ICP standard solution at the CRDL (CRI) is evaluated against the control limits provided.

The CRI analysis results were evaluated for all samples and were within the control limits.

Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra (if applicable) were evaluated according to identification criteria established by the methods. The sample(s) identified in Table 1 were reviewed. The organic compounds reported adhered to the specified identification criteria.

Target Compound Quantitation

The reported quantitation results and detection limits were checked to ensure results reported were accurate. The sample(s) identified in Table 1 were reviewed. No discrepancies were found between the raw data and the sample results reported by the laboratory.

Field Quality Assurance/Quality Control

The field quality assurance/quality control consisted of two (2) field duplicate sample sets and two (2) trip blank samples.

Field Quality Assurance/Quality Control (Continued)Field Duplicate Samples

Overall precision for the sampling event and laboratory procedures was monitored using the results of the field duplicate sample sets. The RPDs associated with these duplicate samples must be less than 50. If the reported concentration in either the investigative sample or its duplicate is less than five times the RL, the evaluation criteria is one or two times the RL value for water and soil samples, respectively.

Table 8 presents the RPDs of detected analytes in duplicate sample sets with qualifiers. The data indicate that an adequate level of precision was achieved for the sampling event.

Trip Blank Samples

To monitor potential cross-contamination of VOC during sample transportation and storage, a trip blank was submitted to the laboratory for VOC analysis with each shipping cooler containing multiple samples.

No target analytes were reported as detected in the trip blank samples that impacted the investigative samples.

System Performance

System performance between various quality control checks was evaluated to monitor for changes that may have caused the degradation of data quality. No technical problems or chromatographic anomalies were observed which would require qualification of the data.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted with the exception of the following:

- VOC data were rejected in a number of samples due to initial and continuing calibration violation.

TABLE 1

SAMPLE COLLECTION AND ANALYSIS SUMMARY
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

							Analysis/Parameters		
Sample Identification	Location	Matrix	QC Samples	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	TCL VOC	TCL PCB	Site TAL Metals	
CRA SDG No.: 52	CAS Lot No.: K1103015								
GW-56393-040611-EV-001	101D	water	MS/MSD-P	4/6/2011	11:55:00 AM	X	X	X	
GW-56393-040611-EV-002	101S	water		4/6/2011	1:15:00 PM	X	X	X	
GW-56393-040611-EV-003	101S	water	DUP (002)	4/6/2011	1:25:00 PM	X	X	X	
GW-56393-040611-EV-004	109D	water		4/6/2011	2:30:00 PM	X	X	X	
TB3-56393-040611	--	water	Trip Blank	4/6/2011	11:59:00 PM	X			
CRA SDG No.: 53	CAS Lot No.: K1103103								
GW-56393-040711-EV-005	108S	water	MS/MSD-P	4/7/2011	10:55:00 AM	X	X	X	
GW-56393-040711-EV-006	108D	water		4/7/2011	9:25:00 AM	X	X	X	
GW-56393-040711-EV-007	107S	water		4/7/2011	10:05:00 AM	X	X	X	
GW-56393-040711-EV-008	106S	water		4/7/2011	11:55:00 AM	X	X	X	
GW-56393-040711-EV-009	106D	water		4/7/2011	12:50:00 PM	X	X	X	
GW-56393-040711-EV-010	105S	water		4/7/2011	1:45:00 PM	X	X	X	
GW-56393-040711-EV-011	105D	water		4/7/2011	2:35:00 PM	X	X	X	
GW-56393-040711-EV-012	104S	water		4/7/2011	3:30:00 PM	X	X	X	
GW-56393-040711-EV-013	104D	water		4/7/2011	4:25:00 PM	X	X	X	
GW-56393-040711-EV-014	103D	water		4/7/2011	5:05:00 PM	X	X	X	
GW-56393-040811-EV-015	102D	water		4/8/2011	9:10:00 AM	X	X	X	
GW-56393-040811-EV-016	102D	water	DUP (015)	4/8/2011	10:05:00 AM	X	X	X	
GW-56393-040811-EV-017	102S	water		4/8/2011	10:15:00 AM	X	X	X	
Trip Blank	--	water	Trip Blank	4/7/2011	11:59:00 PM	X			

Notes:

- DUP - Field Duplicate Sample of sample in parenthesis
- MS/MSD-P - Matrix Spike/Matrix Spike Duplicate (Partial parameters)
- PCB - Polychlorinated biphenyls
- QC - Quality Control
- TAL - Target Analyte List
- TCL - Target Compound List
- VOC - Volatile Organic Compounds

TABLE 2

SUMMARY OF ANALYTICAL METHODS, HOLDING TIME PERIODS, AND PRESERVATIVES
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Method¹</i>	<i>Matrix</i>	<i>Holding Time</i>	<i>Preservation</i>
TCL VOC	SW-846 8260	Water	- 14 days from sample collection to completion of analysis.	pH < 2 and Iced, 4 ± 2° C
TCL PCB	SW-846 8082	Water	- 7 days from sample collection to extraction - 40 days from extraction to completion of analysis	Iced, 4 ± 2° C
Site TAL Metals		Water	- 180 days from sample collection to completion of analysis	pH < 2 and Iced, 4 ± 2° C
Aluminum	EPA-WW 200.8			
Antimony	EPA-WW 200.8			
Arsenic	EPA-WW 200.8			
Barium	EPA-WW 200.8			
Beryllium	EPA-WW 200.8			
Cadmium	EPA-WW 200.8			
Chromium	EPA-WW 200.8			
Cobalt	EPA-WW 200.8			
Copper	EPA-WW 200.8			
Iron	SW-846 6010B			
Lead	EPA-WW 200.8			
Magnesium	SW-846 6010B			
Manganese	EPA-WW 200.8			
Nickel	EPA-WW 200.8			
Selenium	EPA-WW 200.8			
Silver	EPA-WW 200.8			
Sodium	SW-846 6010B			
Thallium	EPA-WW 200.8			
Vanadium	EPA-WW 200.8			
Zinc	EPA-WW 200.8			
Mercury	SW-846 7470A	Water	- 28 days from sample collection to completion of analysis	pH < 2 and Iced, 4 ± 2° C

Notes

¹ Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, and Promulgated updates, November 1986
EPA-WW - "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, Revised March 1983.

PCB - Polychlorinated biphenyls

TAL - Target Analyte List

TCL - Target Compound List

VOC - Volatile Organic Compounds

TABLE 3

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO VIOLATION OF INITIAL CALIBRATION ACCEPTANCE CRITERIA
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Calibration Date</i>	<i>RRF</i>	<i>Associated Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
TCL VOC	Acetone	02/09/11	0.0302	GW-56393-040611-EV-001	20 R	µg/L
				GW-56393-040611-EV-002	20 R	µg/L
				GW-56393-040611-EV-003	20 R	µg/L
				GW-56393-040611-EV-004	20 R	µg/L
TCL VOC	Acetone	03/31/11	0.0321	GW-56393-040711-EV-005	20 R	µg/L
				GW-56393-040711-EV-006	20 R	µg/L
				GW-56393-040711-EV-007	20 R	µg/L
				GW-56393-040711-EV-008	20 R	µg/L
				GW-56393-040711-EV-009	20 R	µg/L
				GW-56393-040711-EV-010	20 R	µg/L
				GW-56393-040711-EV-011	20 R	µg/L
				GW-56393-040711-EV-012	20 R	µg/L
				GW-56393-040711-EV-013	20 R	µg/L
				GW-56393-040711-EV-014	20 R	µg/L
				GW-56393-040811-EV-015	20 R	µg/L
				GW-56393-040811-EV-016	20 R	µg/L
				GW-56393-040811-EV-017	20 R	µg/L
TCL VOC	2-Butanone	2/9/2010	0.0141	GW-56393-040611-EV-001	20 R	µg/L
				GW-56393-040611-EV-002	20 R	µg/L
				GW-56393-040611-EV-003	20 R	µg/L
				GW-56393-040611-EV-004	20 R	µg/L
TCL VOC	2-Butanone	3/31/2011	0.0122	GW-56393-040711-EV-005	20 R	µg/L
				GW-56393-040711-EV-006	20 R	µg/L
				GW-56393-040711-EV-007	20 R	µg/L
				GW-56393-040711-EV-008	20 R	µg/L
				GW-56393-040711-EV-009	20 R	µg/L
				GW-56393-040711-EV-010	20 R	µg/L
				GW-56393-040711-EV-011	20 R	µg/L
				GW-56393-040711-EV-012	20 R	µg/L
				GW-56393-040711-EV-013	20 R	µg/L
				GW-56393-040711-EV-014	20 R	µg/L
				GW-56393-040811-EV-015	20 R	µg/L

TABLE 3

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO VIOLATION OF INITIAL CALIBRATION ACCEPTANCE CRITERIA
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Calibration Date</i>	<i>RRF</i>	<i>Associated Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
TCL VOC	2-Butanone	3/31/2011	0.0122	GW-56393-040811-EV-016	20 R	µg/L
				GW-56393-040811-EV-017	20 R	µg/L
TCL VOC	4-Methyl-2-pentanone	2/9/2011	0.0461	GW-56393-040611-EV-001	20 R	µg/L
				GW-56393-040611-EV-002	20 R	µg/L
				GW-56393-040611-EV-003	20 R	µg/L
				GW-56393-040611-EV-004	20 R	µg/L
TCL VOC	4-Methyl-2-pentanone	3/31/2011	0.0152	GW-56393-040711-EV-005	20 R	µg/L
				GW-56393-040711-EV-006	20 R	µg/L
				GW-56393-040711-EV-007	20 R	µg/L
				GW-56393-040711-EV-008	20 R	µg/L
				GW-56393-040711-EV-009	20 R	µg/L
				GW-56393-040711-EV-010	20 R	µg/L
				GW-56393-040711-EV-011	20 R	µg/L
				GW-56393-040711-EV-012	20 R	µg/L
				GW-56393-040711-EV-013	20 R	µg/L
				GW-56393-040711-EV-014	20 R	µg/L
				GW-56393-040811-EV-015	20 R	µg/L
				GW-56393-040811-EV-016	20 R	µg/L
				GW-56393-040811-EV-017	20 R	µg/L
TCL VOC	2-Hexanone	2/9/2011	0.0385	GW-56393-040611-EV-001	20 R	µg/L
				GW-56393-040611-EV-002	20 R	µg/L
				GW-56393-040611-EV-003	20 R	µg/L
				GW-56393-040611-EV-004	20 R	µg/L

Notes:

R - Rejected
RRF - Relative Response Factor
TCL - Target Compound List
VOC - Volatile Organic Compounds

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO VIOLATION OF CONTINUING CALIBRATION REQUIREMENTS
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Calibration Date</i>	<i>RRF</i>	<i>% Recovery or %D</i>	<i>Associated Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
TCL VOC	1,2-Dibromo-3-chloropropane	2/9/2011	0.0494	----	GW-56393-040611-EV-001	2.0 R	µg/L
					GW-56393-040611-EV-002	2.0 R	µg/L
					GW-56393-040611-EV-003	2.0 R	µg/L
					GW-56393-040611-EV-004	2.0 R	µg/L
TCL VOC	Bromomethane	2/9/2011	----	-27	GW-56393-040611-EV-001	0.50 UJ	µg/L
					GW-56393-040611-EV-002	0.50 UJ	µg/L
					GW-56393-040611-EV-003	0.50 UJ	µg/L
					GW-56393-040611-EV-004	0.50 UJ	µg/L
TCL VOC	Dichlorodifluoromethane	2/9/2011	----	-27	GW-56393-040611-EV-001	0.50 UJ	µg/L
					GW-56393-040611-EV-002	0.50 UJ	µg/L
					GW-56393-040611-EV-003	0.50 UJ	µg/L
					GW-56393-040611-EV-004	0.50 UJ	µg/L
TCL VOC	Dichlorodifluoromethane	3/31/2011	----	42	GW-56393-040711-EV-005	0.50 UJ	µg/L
					GW-56393-040711-EV-006	0.50 UJ	µg/L
					GW-56393-040711-EV-007	0.50 UJ	µg/L
					GW-56393-040711-EV-008	0.50 UJ	µg/L
					GW-56393-040711-EV-009	0.50 UJ	µg/L
					GW-56393-040711-EV-010	0.50 UJ	µg/L
					GW-56393-040711-EV-011	0.50 UJ	µg/L
					GW-56393-040711-EV-012	0.50 UJ	µg/L
					GW-56393-040711-EV-013	0.50 UJ	µg/L
					GW-56393-040711-EV-014	0.50 UJ	µg/L
					GW-56393-040811-EV-015	0.50 UJ	µg/L
					GW-56393-040811-EV-016	0.50 UJ	µg/L
					GW-56393-040811-EV-017	0.50 UJ	µg/L

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO VIOLATION OF CONTINUING CALIBRATION REQUIREMENTS
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Calibration Date</i>	<i>RRF</i>	<i>% Recovery or %D</i>	<i>Associated Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
TCL VOC	Vinyl chloride	3/31/2011	----	-27	GW-56393-040711-EV-005	0.50 UJ	µg/L
					GW-56393-040711-EV-006	0.50 UJ	µg/L
					GW-56393-040711-EV-007	0.50 UJ	µg/L
					GW-56393-040711-EV-008	0.50 UJ	µg/L
					GW-56393-040711-EV-009	0.50 UJ	µg/L
					GW-56393-040711-EV-010	0.50 UJ	µg/L
					GW-56393-040711-EV-011	0.50 UJ	µg/L
					GW-56393-040711-EV-012	0.50 UJ	µg/L
					GW-56393-040711-EV-013	0.50 UJ	µg/L
					GW-56393-040711-EV-014	0.50 UJ	µg/L
					GW-56393-040811-EV-015	0.50 UJ	µg/L
					GW-56393-040811-EV-016	0.50 UJ	µg/L
					GW-56393-040811-EV-017	0.50 UJ	µg/L

Notes:

UJ - Non-detect with an Estimated Report Limit

R - Rejected

RRF - Relative Response Factor

%D - Percent Difference

TCL - Target Compound List

VOC - Volatile Organic Compounds

TABLE 5

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO METHOD BLANK CONTAMINATION
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Analysis Date</i>	<i>Blank Result</i>	<i>Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
TCL VOC	Benzene	4/12/2011	0.070 J	GW-56393-040711-EV-005	0.50 U	µg/L
				GW-56393-040711-EV-006	0.50 U	µg/L
				GW-56393-040711-EV-007	0.50 U	µg/L
				GW-56393-040711-EV-008	0.50 U	µg/L
				GW-56393-040711-EV-009	0.50 U	µg/L
				GW-56393-040711-EV-010	0.50 U	µg/L
				GW-56393-040711-EV-011	0.50 U	µg/L
				GW-56393-040711-EV-012	0.50 U	µg/L
				GW-56393-040711-EV-013	0.50 U	µg/L
				GW-56393-040711-EV-014	0.50 U	µg/L
				GW-56393-040811-EV-015	0.50 U	µg/L
				GW-56393-040811-EV-016	0.50 U	µg/L
				GW-56393-040811-EV-017	0.50 U	µg/L
Site TAL Metals	Chromium	5/3/2011	0.07J	GW-56393-040711-EV-006	0.20 U	µg/L
				GW-56393-040711-EV-007	0.22 U	µg/L
				GW-56393-040711-EV-010	0.24 U	µg/L
				GW-56393-040711-EV-011	0.22 U	µg/L
				GW-56393-040711-EV-012	0.35 U	µg/L
				GW-56393-040711-EV-014	0.29 U	µg/L
				GW-56393-040811-EV-015	0.26 U	µg/L
				GW-56393-040811-EV-016	0.31 U	µg/L
				GW-56393-040811-EV-017	0.34 U	µg/L

Notes:

U - Qualified as Not Detected at the report limit

TAL - Target Analyte List

TCL - Target Compound List

VOC - Volatile Organic Compounds

TABLE 6

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO LABORATORY BLANK CONTAMINATION
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Analysis Date</i>	<i>Blank Result</i>	<i>Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
Site TAL Metals	Antimony	5/3/2011	0.030J	GW-56393-040711-EV-005	0.07 U	µg/L
				GW-56393-040711-EV-006	0.08 U	µg/L
				GW-56393-040711-EV-007	0.06 U	µg/L
				GW-56393-040711-EV-008	0.11 U	µg/L
				GW-56393-040711-EV-010	0.05 U	µg/L
				GW-56393-040711-EV-011	0.05 U	µg/L
				GW-56393-040711-EV-012	0.05 U	µg/L
				GW-56393-040711-EV-013	0.07 U	µg/L
				GW-56393-040711-EV-014	0.05 U	µg/L
				GW-56393-040811-EV-015	0.05 U	µg/L
				GW-56393-040811-EV-016	0.05 U	µg/L
				GW-56393-040811-EV-017	0.05 U	µg/L
Site TAL Metals	Silver	5/3/2011	0.008J	GW-56393-040711-EV-005	0.020 U	µg/L
				GW-56393-040711-EV-006	0.020 U	µg/L
				GW-56393-040711-EV-007	0.020 U	µg/L
				GW-56393-040711-EV-008	0.020 U	µg/L
Site TAL Metals	Thallium	5/3/2011	0.003J	GW-56393-040711-EV-005	0.020 U	µg/L
				GW-56393-040711-EV-010	0.020 U	µg/L
				GW-56393-040711-EV-011	0.020 U	µg/L
				GW-56393-040711-EV-012	0.020 U	µg/L
				GW-56393-040711-EV-013	0.020 U	µg/L
				GW-56393-040711-EV-014	0.020 U	µg/L
				GW-56393-040811-EV-015	0.020 U	µg/L

Notes:

U - Qualified as Not Detected at the report limit

TAL - Target Analyte List

TABLE 7

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO VIOLATION OF ICP SERIAL DILUTION CONTROL LIMITS
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Serial Dilution Sample ID</i>	<i>%D</i>	<i>Associated Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
Site TAL Metals	Iron	GW-56393-040711-EV-005	12.1	GW-56393-040711-EV-005	275 J	ug/L
				GW-56393-040711-EV-006	240 J	ug/L
				GW-56393-040711-EV-007	830 J	ug/L
				GW-56393-040711-EV-008	20800 J	ug/L
				GW-56393-040711-EV-009	14.9 J	ug/L
				GW-56393-040711-EV-010	419 J	ug/L
				GW-56393-040711-EV-011	16.8 J	ug/L
				GW-56393-040711-EV-012	474 J	ug/L
				GW-56393-040711-EV-013	34.4 J	ug/L
				GW-56393-040711-EV-014	19.6 J	ug/L
				GW-56393-040811-EV-015	171 J	ug/L
				GW-56393-040811-EV-016	430 J	ug/L
				GW-56393-040811-EV-017	426 J	ug/L

Notes:

J - Estimated Concentration

%D - Percent Difference

TAL - Target Analyte List

TABLE 8

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO VARIABILITY IN FIELD DUPLICATE RESULTS
GROUNDWATER MONITORING - APRIL 2011
12 TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

<i>Parameter</i>	<i>Analyte</i>	<i>Criteria</i>	<i>RPD/ Diff</i>	<i>Sample ID</i>	<i>Qualified Result</i>	<i>Field Duplicate Sample ID</i>	<i>Qualified Result</i>	<i>Units</i>
Site TAL Metals	Cobalt	RPD	107	GW-56393-040811-EV-015	0.153 J	GW-56393-040811-EV-016	0.506 J	ug/L
Site TAL Metals	Manganese	RPD	194	GW-56393-040811-EV-015	8.35 J	GW-56393-040811-EV-016	577 J	ug/L

Notes:

J - Estimated Concentration

RPD - Relative Percent Difference

Diff - Difference

TAL - Target Analyte List